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EXAMINER

BERNATZ, KEVIN M

ART UNIT PAPER NUMBER

1773

DATE MAILED: 09/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/722,599

Applicant(s)

MAEDA ET AL.

Examiner

Kevin M. Bernatz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☒ Claim(s) 7 and 8 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 May 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 11/28/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Objections

1. Claim 8 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 7. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k). The Examiner notes that the reason these claims are considered duplicates is that the only difference in the claim language is the nomenclature used to name the extra layer. Since it is impermissible to read limitations from the specification into the claims, the scope of these claims are identical – namely that an extra layer (magnetic or non-magnetic, since not limited in the claim) must be present between the substrate and the underlayer.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section

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351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1 – 8 and 12 – 14 are rejected under 35 U.S.C. 102(a), (b) and/or (e) as being anticipated by Kikitsu et al. (U.S. Patent App. No. 2001/0051287 A1).

Regarding claim 1, Kikitsu et al. disclose a perpendicular magnetic recording medium (*Paragraph 0085*) comprising a substrate (*Paragraph 0328*), an underlayer formed on the substrate meeting applicants' claimed material limitations (*Paragraph 0328 – (Fe₅₅Pt₄₅)Al₁₀*) and a magnetic layer formed on the underlayer meeting applicants' claimed material limitations (*Paragraph 0328 – (Fe₅₅Pt₄₅)Cu₁₀*).

Regarding the limitation "and containing crystal grains having an L1₀ structure", it has been held that where claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established and the burden of proof is shifted to applicant to show that prior art products do not necessarily or inherently possess characteristics of claimed products where the rejection is based on inherency under 35 USC 102 or on *prima facie* obviousness under 35 USC 103, jointly or alternatively. Therefore, the *prima facie* case can be rebutted by **evidence** showing that the prior art products do not necessarily possess the characteristics of the claimed product. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

In the instant case, the Examiner notes that FePt alloys, such as disclosed in Kikitsu et al. deposited as used in Kikitsu et al. are known in the art to form high-anisotropy L1₀ alloys.

Therefore, in addition to the above disclosed limitations, the presently claimed property would have inherently been present because the prior art materials and method of deposition is known in the art to result in high-anisotropy L1₀ alloys.

Regarding claims 2 and 3, the Examiner deems that these limitations are inherently met by the disclosed prior art, since the disclosed prior art is a known L1₀ alloy deposited in a substantially identical composition and method as disclosed by applicants (*specification, page 12 and Figure 5*).

Regarding claims 4 - 6, Kikitsu et al. disclose embodiments meeting applicants' claimed molar compositions (*Paragraph 0328*).

Regarding claims 7 and 8, Kikitsu et al. disclose a layer between the substrate and the underlayer meeting applicants' claimed structural limitations (*Paragraph 0328 – "MgO"*). The language of "seed layer" and/or "crystal orientation layer" is simply nomenclature to name the layer and is not deemed to further limit the layer since it is impermissible to read language from the specification into the claims.

Regarding claims 12 and 13, Kikitsu et al. disclose magnetic layers meeting applicants' claimed thickness limitations (*Paragraph 0328*).

Regarding claim 14, Kikitsu et al. disclose a protective layer meeting applicants' claimed limitations (*Paragraph 0328*).

4. Claims 1 – 3, 5 - 8 and 11 - 13 are rejected under 35 U.S.C. 102(a), (b) and/or (e) as being anticipated by Suzuki et al. (U.S. Patent No. 6,599,646 B2).

Regarding claim 1, Suzuki et al. disclose a perpendicular magnetic recording medium (*col. 4, lines 56 - 57*) comprising a substrate (*col. 7, lines 50 - 53*), an underlayer formed on the substrate meeting applicants' claimed material limitations (*Figure 1D, element 40 and col. 5, lines 51 – 59: {Pt, Pd, Au or Fe} combined with MgO*) and a magnetic layer formed on the underlayer meeting applicants' claimed material limitations (*element 10'*) and containing crystal grains having an L1₀ structure (*col. 4, lines 56 – 65*).

Regarding claims 2 and 3, Suzuki et al. disclose crystal grains meeting applicants' claimed orientation limitations (*Figure 1D*).

Regarding claims 5 and 6, Suzuki et al. disclose embodiments meeting applicants' claimed molar compositions (*col. 5, lines 18 - 30*).

Regarding claims 7, 8 and 11, Suzuki et al. disclose layers between the substrate and the underlayer meeting applicants' claimed structural limitations (*Figure 2A, elements 41 and 51*). The Examiner notes that while Suzuki et al. does not explicitly teach using the material listed for the underlayer 40 as the materials for the nonmagnetic layer 20, the Examiner notes that Suzuki et al. does explicitly mention that both are used for controlling the crystal structure of the magnetic layer (*col. 5, lines 51 – 59 and col. 6, lines 13 – 64*). Given that Suzuki et al. discloses using the same material (MgO) as both layers in all their embodiments, the Examiner deems that there is sufficient specificity that one of ordinary skill in the art would recognize that identical

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compounds could be used for both layers. Hence, compounds of {Pt, Pd, Au or Fe} with MgO are implicitly taught for the non-magnetic layer 20, which reads on applicants' material limitations for the claimed "underlayer".

Regarding claims 12 and 13, Suzuki et al. disclose magnetic layers meeting applicants' claimed thickness limitations (*col. 5, lines 38 - 44*).

5. Claims 1, 2, 5, 12 and 13 are rejected under 35 U.S.C. 102(a) and/or (e) as being anticipated by Litvinov et al. (U.S. Patent App. No. 2003/0113582 A1).

Regarding claim 1, Litvinov et al. disclose a perpendicular magnetic recording medium (*Paragraph 0039*) comprising a substrate (*Figure 4, element 10*), an underlayer formed on the substrate meeting applicants' claimed material limitations (*element 40 – "FeTaN"*) and a magnetic layer formed on the underlayer meeting applicants' claimed material limitations (*element 30*) and containing crystal grains having an L1₀ structure (*Paragraph 0021*).

Regarding claim 2, it has been held that where claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established and the burden of proof is shifted to applicant to show that prior art products do not necessarily or inherently possess characteristics of claimed products where the rejection is based on inherency under 35 USC 102 or on *prima facie* obviousness under 35 USC 103, jointly or alternatively. Therefore, the *prime facie* case can be rebutted by **evidence** showing that the prior art products do not

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necessarily possess the characteristics of the claimed product. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

In the instant case, the Examiner notes that the L1₀ alloys, such as disclosed in Litvinov et al. deposited on (100)-oriented surface (*Paragraph 0041*) are known in the art to form high-anisotropy L1₀ alloys possessing a crystal orientation meeting applicants' claimed limitations (*applicants' specification, pages 14 – 16*).

Therefore, in addition to the above disclosed limitations, the presently claimed property would have inherently been present because the prior art materials and method of deposition is known in the art to result in high-anisotropy L1₀ alloys possessing the claimed crystal orientation.

Regarding claim 5, Litvinov et al. disclose embodiments meeting applicants' claimed composition (*Paragraph 0021*).

Regarding claims 12 and 13, Litvinov et al. disclose magnetic layers meeting applicants' claimed thickness limitations (*Paragraph 0019*).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1 – 8 and 11 – 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikitsu et al. as applied above, and further in view of Suzuki et al. ('646 B2).

Kikitsu et al. is relied upon as described above.

Regarding claims 1 – 3, while the Examiner maintains that Kikitsu et al. inherently discloses the recited L10 crystal grains and the crystal structure of the magnetic and underlayer, Kikitsu et al. fail to explicitly disclose these limitations.

However, even in the event that these limitations are shown to have not been inherent in the teachings of Kikitsu et al. relied upon above, Suzuki et al. teach that the FePt alloys utilized by Kikitsu et al. can possess high anisotropy and excellent perpendicular magnetic characteristics when controlled to possess a L1₀ microstructure in combination with the crystal orientation limitations recited for both the magnetic layer and underlayer in claims 2 and 3 (*Suzuki et al.*, *Figure 1D*; *col. 1, lines 49 – 65*; and *col. 5, lines 51 – 59*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Kikitsu et al. to insure that the disclose alloys possess L1₀ crystal grains and that the magnetic and underlayer meet

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applicants' claimed crystal orientation limitations as taught by Suzuki et al. in order to produce a recording medium with high anisotropy and good perpendicular magnetic characteristics.

Regarding claims 4 – 8 and 12 – 14, Kikitsu et al. is relied upon as described above.

Regarding claim 11, Suzuki et al. teach that multiple layers meeting applicants' claimed structural limitations can be formed under the underlayer meeting applicants' claimed composition limitations (*Figures 2A and 2B, layers 31 - 51*).

8. Claims 9 – 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikitsu et al. as applied above in Paragraph 3, and further in view of Chen et al. (U.S. Patent App. No. 2004/0191578 A1).

Kikitsu et al. is relied upon as described above.

Regarding claims 9 and 10, Kikitsu et al. fail to disclose a crystal orientation layer meeting applicants' claimed composition limitations.

However, Chen et al. teach forming a Cr-alloy layer meeting applicants' claimed composition limitations under a $L1_0$ structured layer in order to facilitate the orientation of the $L1_0$ structured layer (*Paragraphs 0031 – 0033*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Kikitsu et al. to utilize a Cr-alloy layer meeting applicants' claimed composition limitations as taught by Chen et al. between

the L1₀ structured underlayer and the substrate, since such a Cr-alloy layer can facilitate the orientation of the L1₀ structured layer.

Regarding claim 11, Chen et al. teach forming a seed layer under the Cr-alloy layer to decrease the crystal size of the Cr-alloy layer (*Paragraph 0033*).

9. Claims 9 – 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikitsu et al. in view of Suzuki et al. as applied above in Paragraph 7, and further in view of Chen et al. ('578 A1).

Kikitsu et al. and Suzuki et al. are relied upon as described above.

Regarding claims 9 and 10, neither of the above disclose a crystal orientation layer meeting applicants' claimed composition limitations.

However, Chen et al. teach forming a Cr-alloy layer meeting applicants' claimed composition limitations under a L1₀ structured layer in order to facilitate the orientation of the L1₀ structured layer (*Paragraphs 0031 – 0033*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Kikitsu et al. in view of Suzuki et al. to utilize a Cr-alloy layer meeting applicants' claimed composition limitations as taught by Chen et al. between the L1₀ structured underlayer and the substrate, since such a Cr-alloy layer can facilitate the orientation of the L1₀ structured layer.

Regarding claim 11, Chen et al. teach forming a seed layer under the Cr-alloy layer to decrease the crystal size of the Cr-alloy layer (*Paragraph 0033*).

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10. Claims 9 - 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikitsu et al. as applied above in Paragraph 3, and further in view of Hokkyo et al. (U.S. Patent No. 6,387,483 B1).

Kikitsu et al. is relied upon as described above.

Regarding claims 9 and 10, Kikitsu et al. fail to disclose a crystal orientation layer meeting applicants' claimed composition limitations.

However, Hokkyo et al. teach forming a Cr-alloy layer meeting applicants' claimed composition limitations under a soft magnetic layer which is between the intermediate and recording layers of a perpendicular magnetic recording medium in order to improve the properties of a perpendicular recording medium by insuring a reduced surface roughness through-out the medium (*col. 1, lines 1 – 30; col. 2, line 48 bridging col. 3, line 17; col. 15, lines 10 – 13; and examples*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Kikitsu et al. to utilize a Cr-alloy layer meeting applicants' claimed composition limitations and a soft magnetic layer as taught by Chen et al. between the intermediate layer (i.e. applicants' "underlayer" and Kikitsu et al's "functional layer") and the substrate, since such a structure can improve the properties of a perpendicular recording medium by insuring a reduced surface roughness through-out the medium.

Regarding claim 11, the Examiner notes that the Cr-alloy layer and the soft magnetic layer read on the two layers being present between the substrate and the intermediate layer (i.e. applicants' "underlayer" and Kikitsu et al's "functional layer").

11. Claims 9 - 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikitsu et al. in view of Suzuki et al. as applied above in Paragraph 7, and further in view of Hokkyo et al. ('483 B1).

Kikitsu et al. and Suzuki et al. are relied upon as described above.

Regarding claims 9 and 10, neither of the above disclose a crystal orientation layer meeting applicants' claimed composition limitations.

However, Hokkyo et al. teach forming a Cr-alloy layer meeting applicants' claimed composition limitations under a soft magnetic layer which is between the intermediate and recording layers of a perpendicular magnetic recording medium in order to improve the properties of a perpendicular recording medium by insuring a reduced surface roughness through-out the medium (*col. 1, lines 1 – 30; col. 2, line 48 bridging col. 3, line 17; col. 15, lines 10 – 13; and examples*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Kikitsu et al. in view of Suzuki et al. to utilize a Cr-alloy layer meeting applicants' claimed composition limitations and a soft magnetic layer as taught by Hokkyo et al. between the intermediate layer (i.e. applicants' "underlayer" and Kikitsu et al's "functional layer") and the substrate, since such a structure can improve the properties of a perpendicular recording medium by insuring a reduced surface roughness through-out the medium.

Regarding claim 11, the Examiner notes that the Cr-alloy layer and the soft magnetic layer read on the two layers being present between the substrate and the intermediate layer (i.e. applicants' "underlayer" and Kikitsu et al's "functional layer").

12. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. ('646 B2) as applied above.

Suzuki et al. is relied upon as described above.

Suzuki et al. fail to disclose the amount of MgO to use in a compound of {Pt, Pd, Au or Fe} with MgO.

However, the Examiner deems that it would have been obvious to one having ordinary skill in the art to have determined the optimum value of a results effective variable such as the relative amounts of the various components through routine experimentation, especially given the teaching in Suzuki et al. regarding the desire to produce a layer possessing a L1₀ crystal structure and the relatively small number of compounds listed as suitable for the layer. *In re Boesch*, 205 USPQ 215 (CCPA 1980); *In re Geisler*, 116 F. 3d 1465, 43 USPQ2d 1362, 1365 (Fed. Cir. 1997); *In re Aller*, 220 F.2d, 454, 456, 105 USPQ 233, 235 (CCPA 1955).

It would, therefore, have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Suzuki et al. to use an underlayer meeting applicants' claimed composition limitations as taught by Suzuki et al., since the optimization of the relative amounts of MgO to {Pt, Pd, Au or Fe} while still

producing a layer possessing a $L1_0$ crystal structure would be within the knowledge of one of ordinary skill in the art.

13. Claims 9 - 11 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. ('646 B2) as applied above in Paragraph 4, and further in view of Chen et al. ('578 A1).

Suzuki et al. is relied upon as described above.

Regarding claims 9 and 10, Suzuki et al. fail to disclose a crystal orientation layer meeting applicants' claimed composition limitations.

However, Chen et al. teach forming a Cr-alloy layer meeting applicants' claimed composition limitations under a $L1_0$ structured layer in order to facilitate the orientation of the $L1_0$ structured layer (*Paragraphs 0031 – 0033*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Suzuki et al. to utilize a Cr-alloy layer meeting applicants' claimed composition limitations as taught by Chen et al. between the $L1_0$ structured underlayer and the substrate, since such a Cr-alloy layer can facilitate the orientation of the $L1_0$ structured layer.

Regarding claim 11, Chen et al. teach forming a seed layer under the Cr-alloy layer to decrease the crystal size of the Cr-alloy layer (*Paragraph 0033*).

Regarding claim 14, Chen et al. teach adding a protecting layer to a recording medium to provide improved mechanical protection (*Figure 7, element 74 and relevant disclosure thereto*).

14. Claims 9 - 11 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. ('646 B2) as applied above in Paragraph 4, and further in view of Hokkyo et al. ('483 B1).

Suzuki et al. is relied upon as described above.

Regarding claims 9 and 10, Suzuki et al. fail to disclose a crystal orientation layer meeting applicants' claimed composition limitations.

However, Hokkyo et al. teach forming a Cr-alloy layer meeting applicants' claimed composition limitations under a soft magnetic layer which is between the intermediate and recording layers of a perpendicular magnetic recording medium in order to improve the properties of a perpendicular recording medium by insuring a reduced surface roughness through-out the medium (*col. 1, lines 1 – 30; col. 2, line 48 bridging col. 3, line 17; col. 15, lines 10 – 13; and examples*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Suzuki et al. to utilize a Cr-alloy layer meeting applicants' claimed composition limitations and a soft magnetic layer as taught by Hokkyo et al. between the intermediate layer (i.e. applicants' "underlayer" and Suzuki et al.'s "non-magnetic layer") and the substrate, since such a structure can improve the properties of a perpendicular recording medium by insuring a reduced surface roughness through-out the medium.

Regarding claim 11, the Examiner notes that the Cr-alloy layer and the soft magnetic layer read on the two layers being present between the substrate and the

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intermediate layer (i.e. applicants' "underlayer" and Suzuki et al.'s "non-magnetic layer").

Regarding claim 14, Hokkyo et al. teach adding a protecting layer to a recording medium to provide improved mechanical protection (*col. 9, lines 33 – 36*).

15. Claims 2, 3, 7, 8 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Litvinov et al. as applied above in Paragraph 5, and further in view of Suzuki et al. ('646 B2).

Litvinov et al. is relied upon as described above.

Litvinov et al. fail to disclose the crystal orientation of the magnetic and underlayer.

However, Suzuki et al. teach controlling the magnetic layer to possess the claimed crystal orientation, as well as the utilization of an underlayer meeting applicants' claimed composition limitation (*i.e. {Pt, Pd, Au or Fe} in combination with MgO*) possessing the claimed crystal orientation for improving the magnetic properties of the perpendicular recording medium (*Figures 1D and 2A, elements 11 and 21; col. 1, lines 49 – 65; col. 3, lines 20 – 62; col. 5, lines 45 – 60; and col. 6, lines 13 - 55*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Litvinov et al. to utilize a magnetic layer and underlayer meeting applicants' claimed crystal orientations as taught by Suzuki et al. in order to improve the magnetic properties of the perpendicular recording medium.

Regarding claims 7 and 8, Suzuki et al. disclose additional layer under the soft magnetic layer to facilitate the crystal orientation and magnetic properties of the recording medium (*Figure 2A, elements 41 and 51, and relevant disclosure thereto*).

16. Claims 4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Litvinov et al. as applied above in Paragraph 5.

Litvinov et al. fail to disclose the amount of element B (*Paragraph 0021 - Ta*) to use in the magnetic layer, or the amount of the element B (*Paragraph 0022 – Al, Ta, Zr, Nb, AlN, or TaN*) to use in the soft magnetic underlayer.

However, the Examiner deems that it would have been obvious to one having ordinary skill in the art to have determined the optimum value of a results effective variable such as the relative amounts of the various components through routine experimentation, especially given the teaching in Litvinov et al. regarding the explicit alloy structure of the soft magnetic layer and the obvious desire to optimize the *soft magnetic* properties of the soft magnetic underlayer and the relatively small number of compounds listed as suitable for addition to the perpendicular recording layer, and the obvious desire to optimize the *perpendicular magnetic* properties of the recording layer.

It would, therefore, have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Litvinov et al. to use an underlayer and a magnetic layer meeting applicants' claimed composition limitations as taught by Litvinov et al. since optimization of the composition of known magnetic alloys is within the knowledge of one of ordinary skill in the art.

17. Claims 7 - 10 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Litvinov et al. as applied above in Paragraph 5, and further in view of Hokkyo et al. ("483 B1).

Litvinov et al. is relied upon as described above.

Regarding claims 7 - 10, Litvinov et al. fail to disclose an additional layer (i.e. applicants' "seed layer" or "crystal orientation" layer) meeting applicants' claimed structural and/or composition limitations.

However, Hokkyo et al. teach forming a Cr-alloy layer meeting applicants' claimed composition limitations under a soft magnetic layer in order to improve the properties of a perpendicular recording medium by insuring a reduced surface roughness through-out the medium (*col. 1, lines 1 – 30; col. 2, line 48 bridging col. 3, line 17; col. 15, lines 10 – 13; and examples*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Litvinov et al. to utilize a Cr-alloy layer meeting applicants' claimed composition and structural limitations as taught by Hokkyo et al. since such a structure can improve the properties of a perpendicular recording medium by insuring a reduced surface roughness through-out the medium.

Regarding claim 14, Hokkyo et al. teach adding a protecting layer to a recording medium to provide improved mechanical protection (*col. 9, lines 33 – 36*).

Conclusion

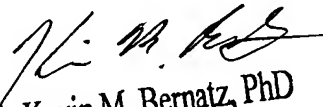
18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. A wide range of references are related to L10 recording layers with various underlayer structures. Several of these would qualify under 102 and/or 103 statutes, but no rejections have been made since the above applied art is deemed the closest art of record. The related art is: Litvinov et al. (U.S. Patent No. 6,645,647 B1), Ristau (U.S. Patent No. 6,541,131 B1), Coffey et al. (U.S. Patent No. 5,989,728), Maeda et al. (U.S. Patent No. 6,777,078 B2), Chang et al. (U.S. Patent No. 6,709,773 B1) and Wong et al. (U.S. Patent No. 6,428,906 B1).

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M Bernatz whose telephone number is (571) 272-1505. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on (571) 272-1284. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KMB
September 25, 2005


Kevin M. Bernatz, PhD
Primary Examiner